

SEQUENCE LISTING

<110> Yoganathan, Thillainathan
Delaney, Allen

<120> CAMK-X1 and its Uses

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<141> 2001-09-20

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| Met Gly Arg Lys Glu Glu Asp Asp Cys Ser Ser Trp Lys Lys | |
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| cag acc acc aac atc cgg aaa acc ttc att ttt atg gaa gtg ctg gga | 159 |
| Gln Thr Thr Asn Ile Arg Lys Thr Phe Ile Phe Met Glu Val Leu Gly | |
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| tca gga gct ttc tca gaa gtt ttc ctg gtg aag caa aga ctg act ggg | 207 |
| Ser Gly Ala Phe Ser Glu Val Phe Leu Val Lys Gln Arg Leu Thr Gly | |
| 35 40 45 | |
| aag ctc ttt gct ctg aag tgc atc aag aag tca cct gcc ttc cgg gac | 255 |
| Lys Leu Phe Ala Leu Lys Cys Ile Lys Lys Ser Pro Ala Phe Arg Asp | |
| 50 55 60 | |
| agc agc ctg gag aat gag att gct gtg ttg aaa aag atc aag cat gaa | 303 |
| Ser Ser Leu Glu Asn Glu Ile Ala Val Leu Lys Lys Ile Lys His Glu | |
| 65 70 75 | |
| aac att gtg acc ctg gag gac atc tat gag agc acc acc cac tac tac | 351 |
| Asn Ile Val Thr Leu Glu Asp Ile Tyr Glu Ser Thr Thr His Tyr Tyr | |
| 80 85 90 | |
| ctg gtc atg cag ctt gtt tct ggt ggg gag ctc ttt gac cgg atc ctg | 399 |

| | | | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|------|
| Leu | Val | Met | Gln | Leu | Val | Ser | Gly | Gly | Glu | Leu | Phe | Asp | Arg | Ile | Leu | | |
| 95 | | | | | 100 | | | | | 105 | | | | | 110 | | |
| gag | cgg | ggt | gtc | tac | aca | gag | aag | gat | gcc | agt | ctg | gtg | atc | cag | cag | | 447 |
| Glu | Arg | Gly | Val | Tyr | Thr | Glu | Lys | Asp | Ala | Ser | Leu | Val | Ile | Gln | Gln | | |
| | | | 115 | | | | | | 120 | | | | | 125 | | | |
| gtc | ttg | tcg | gca | gtg | aaa | tac | cta | cat | gag | aat | ggc | atc | gtc | cac | aga | | 495 |
| Val | Leu | Ser | Ala | Val | Lys | Tyr | Leu | His | Glu | Asn | Gly | Ile | Val | His | Arg | | |
| | | | 130 | | | | | 135 | | | | | 140 | | | | |
| gac | tta | aag | ccc | gaa | aac | ctg | ctt | tac | ctt | acc | cct | gaa | gag | aac | tct | | 543 |
| Asp | Leu | Lys | Pro | Glu | Asn | Leu | Leu | Tyr | Leu | Thr | Pro | Glu | Glu | Asn | Ser | | |
| | | 145 | | | | | 150 | | | | | 155 | | | | | |
| aag | atc | atg | atc | act | gac | ttt | ggt | ctg | tcc | aag | atg | gaa | cag | aat | ggc | | 591 |
| Lys | Ile | Met | Ile | Thr | Asp | Phe | Gly | Leu | Ser | Lys | Met | Glu | Gln | Asn | Gly | | |
| | 160 | | | | | 165 | | | | 170 | | | | | | | |
| atc | atg | tcc | act | gcc | tgt | ggg | acc | cca | ggc | tac | gtg | gct | cca | gaa | gtg | | 639 |
| Ile | Met | Ser | Thr | Ala | Cys | Gly | Thr | Pro | Gly | Tyr | Val | Ala | Pro | Glu | Val | | |
| 175 | | | | | 180 | | | | | 185 | | | | | 190 | | |
| ctg | gcc | cag | aaa | ccc | tac | agc | aag | gct | gtg | gat | tgc | tgg | tcc | atc | ggc | | 687 |
| Leu | Ala | Gln | Lys | Pro | Tyr | Ser | Lys | Ala | Val | Asp | Cys | Trp | Ser | Ile | Gly | | |
| | | | | 195 | | | | 200 | | | | | | 205 | | | |
| gtc | atc | acc | tac | ata | ttg | ctc | tgt | gga | tac | ccc | ccg | ttc | tat | gaa | gaa | | 735 |
| Val | Ile | Thr | Tyr | Ile | Leu | Leu | Cys | Gly | Tyr | Pro | Pro | Phe | Tyr | Glu | Glu | | |
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| acg | gag | tct | aag | ctt | ttc | gag | aag | atc | aag | gag | ggc | tac | tat | gag | ttt | | 783 |
| Thr | Glu | Ser | Lys | Leu | Phe | Glu | Lys | Ile | Lys | Glu | Gly | Tyr | Tyr | Glu | Phe | | |
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| gag | tct | cca | ttc | tgg | gat | gac | att | tct | gag | tca | gcc | aag | gac | ttt | att | | 831 |
| Glu | Ser | Pro | Phe | Trp | Asp | Asp | Ile | Ser | Glu | Ser | Ala | Lys | Asp | Phe | Ile | | |
| | 240 | | | | | 245 | | | | | 250 | | | | | | |
| tgc | cac | ttg | ctt | gag | aag | gat | ccg | aac | gag | cgg | tac | acc | tgt | gag | aag | | 879 |
| Cys | His | Leu | Leu | Glu | Lys | Asp | Pro | Asn | Glu | Arg | Tyr | Thr | Cys | Glu | Lys | | |
| 255 | | | | | 260 | | | | 265 | | | | | 270 | | | |
| gcc | ttg | agt | cat | ccc | tgg | att | gac | gga | aac | acg | gcc | ctc | cac | cgg | gac | | 927 |
| Ala | Leu | Ser | His | Pro | Trp | Ile | Asp | Gly | Asn | Thr | Ala | Leu | His | Arg | Asp | | |
| | | | | 275 | | | | 280 | | | | | | 285 | | | |
| atc | tac | cca | tca | gtc | agc | ctc | cag | atc | cag | aag | aac | ttt | gct | aag | agc | | 975 |
| Ile | Tyr | Pro | Ser | Val | Ser | Leu | Gln | Ile | Gln | Lys | Asn | Phe | Ala | Lys | Ser | | |
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| aag | tgg | agg | caa | gcc | ttc | aac | gca | gca | gct | gtg | gtg | cac | cac | atg | agg | | 1023 |
| Lys | Trp | Arg | Gln | Ala | Phe | Asn | Ala | Ala | Ala | Val | Val | His | His | Met | Arg | | |
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| | |
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| aag cta cac atg aac ctg cac agc ccg ggc gtc cgc cca gag gtg gag | 1071 |
| Lys Leu His Met Asn Leu His Ser Pro Gly Val Arg Pro Glu Val Glu | |
| 320 325 330 | |
| aac agg ccg cct gaa act caa gcc tca gaa acc tct aga ccc agc tcc | 1119 |
| Asn Arg Pro Pro Glu Thr Gln Ala Ser Glu Thr Ser Arg Pro Ser Ser | |
| 335 340 345 350 | |
| cct gag atc acc atc acc gag gca cct gtc ctg gac cac agt gta gca | 1167 |
| Pro Glu Ile Thr Ile Thr Glu Ala Pro Val Leu Asp His Ser Val Ala | |
| 355 360 365 | |
| ctc cct gcc ctg acc caa tta ccc tgc cag cat ggc cgc cgg ccc act | 1215 |
| Leu Pro Ala Leu Thr Gln Leu Pro Cys Gln His Gly Arg Arg Pro Thr | |
| 370 375 380 | |
| gcc cct ggt ggc agg tcc ctc aac tgc ctg gtc aat ggc tcc ctc cac | 1263 |
| Ala Pro Gly Gly Arg Ser Leu Asn Cys Leu Val Asn Gly Ser Leu His | |
| 385 390 395 | |
| atc agc agc agc ctg gtg ccc atg cat cag ggg tcc ctg gcc gcc ggg | 1311 |
| Ile Ser Ser Ser Leu Val Pro Met His Gln Gly Ser Leu Ala Ala Gly | |
| 400 405 410 | |
| ccc tgt ggc tgc tgc tcc agc tgc ctg aac att ggg agc aaa gga aag | 1359 |
| Pro Cys Gly Cys Cys Ser Ser Cys Leu Asn Ile Gly Ser Lys Gly Lys | |
| 415 420 425 430 | |
| tcc tcc tac tgc tct gag ccc aca ctc ctc aaa aag gcc aac aaa aaa | 1407 |
| Ser Ser Tyr Cys Ser Glu Pro Thr Leu Leu Lys Lys Ala Asn Lys Lys | |
| 435 440 445 | |
| cag aac ttc aag tgc gag gtc atg gta cca gtt aaa gcc agt ggc agc | 1455 |
| Gln Asn Phe Lys Ser Glu Val Met Val Pro Val Lys Ala Ser Gly Ser | |
| 450 455 460 | |
| tcc cac tgc cgg gca ggg cag act gga gtc tgt ctc att atg t | 1498 |
| Ser His Cys Arg Ala Gly Gln Thr Gly Val Cys Leu Ile Met | |
| 465 470 475 | |
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| ctcttccaaa cctggtgtct atccggcaga gggaggaagg cagagcaagt ggagcagggc | 1618 |
| ttagcaggag cagtttctgg ccagaagcac cagcctgctg ccagcggggc agcccctcat | 1678 |
| aggaggccca ggaggagacc ccaaggcgta gaagccttgt tgaagctgtg agcaggagaa | 1738 |
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| gccagattgg gctcattaat gtcgttgcc gcccatctgc atgaatgaca ggcagctccc | 2038 |
| catggtggtc tgctgtgag ctcttcaagt tctaattcct aactccagga ttagctccca | 2098 |
| agtgcgtga gacccagcca gcacacttct ggcccttctc cctgcctcaa tctaaaagca | 2158 |
| gtgccacacc ctccaaagtg gaatagaaag aagttcatga gtaagggtg caaggaattc | 2218 |
| ttatcctggc cacatgtcct ccgtgcacac acccaatgga gttaaccttg gaagttgact | 2278 |

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| ccagcacacc | attcttgtcc | ttccccagtt | tcctcgccct | ccaccctcc | agcttcatgc | 2398 |
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| Thr | Asn | Ile | Arg | Lys | Thr | Phe | Ile | Phe | Met | Glu | Val | Leu | Gly | Ser | Gly |
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| Ala | Phe | Ser | Glu | Val | Phe | Leu | Val | Lys | Gln | Arg | Leu | Thr | Gly | Lys | Leu |
| | | | 35 | | | | | 40 | | | | | 45 | | |
| Phe | Ala | Leu | Lys | Cys | Ile | Lys | Lys | Ser | Pro | Ala | Phe | Arg | Asp | Ser | Ser |
| | | | 50 | | | | | 55 | | | | 60 | | | |
| Leu | Glu | Asn | Glu | Ile | Ala | Val | Leu | Lys | Lys | Ile | Lys | His | Glu | Asn | Ile |
| 65 | | | | | | 70 | | | | 75 | | | | | 80 |
| Val | Thr | Leu | Glu | Asp | Ile | Tyr | Glu | Ser | Thr | Thr | His | Tyr | Tyr | Leu | Val |
| | | | | | | 85 | | | | 90 | | | | 95 | |
| Met | Gln | Leu | Val | Ser | Gly | Gly | Glu | Leu | Phe | Asp | Arg | Ile | Leu | Glu | Arg |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Gly | Val | Tyr | Thr | Glu | Lys | Asp | Ala | Ser | Leu | Val | Ile | Gln | Gln | Val | Leu |
| | | | 115 | | | | | 120 | | | | | 125 | | |
| Ser | Ala | Val | Lys | Tyr | Leu | His | Glu | Asn | Gly | Ile | Val | His | Arg | Asp | Leu |
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| Lys | Pro | Glu | Asn | Leu | Leu | Tyr | Leu | Thr | Pro | Glu | Glu | Asn | Ser | Lys | Ile |
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| Met | Ile | Thr | Asp | Phe | Gly | Leu | Ser | Lys | Met | Glu | Gln | Asn | Gly | Ile | Met |
| | | | | | | 165 | | | | 170 | | | | 175 | |
| Ser | Thr | Ala | Cys | Gly | Thr | Pro | Gly | Tyr | Val | Ala | Pro | Glu | Val | Leu | Ala |
| | | | | | | 180 | | | | 185 | | | | 190 | |
| Gln | Lys | Pro | Tyr | Ser | Lys | Ala | Val | Asp | Cys | Trp | Ser | Ile | Gly | Val | Ile |
| | | | | | | 195 | | | | 200 | | | | 205 | |
| Thr | Tyr | Ile | Leu | Leu | Cys | Gly | Tyr | Pro | Pro | Phe | Tyr | Glu | Glu | Thr | Glu |
| | | | | | | 210 | | | | 215 | | | | 220 | |
| Ser | Lys | Leu | Phe | Glu | Lys | Ile | Lys | Glu | Gly | Tyr | Tyr | Glu | Phe | Glu | Ser |
| 225 | | | | | | 230 | | | | 235 | | | | | 240 |
| Pro | Phe | Trp | Asp | Asp | Ile | Ser | Glu | Ser | Ala | Lys | Asp | Phe | Ile | Cys | His |
| | | | | | | 245 | | | | 250 | | | | 255 | |
| Leu | Leu | Glu | Lys | Asp | Pro | Asn | Glu | Arg | Tyr | Thr | Cys | Glu | Lys | Ala | Leu |
| | | | | | | 260 | | | | 265 | | | | 270 | |
| Ser | His | Pro | Trp | Ile | Asp | Gly | Asn | Thr | Ala | Leu | His | Arg | Asp | Ile | Tyr |
| | | | | | | 275 | | | | 280 | | | | 285 | |
| Pro | Ser | Val | Ser | Leu | Gln | Ile | Gln | Lys | Asn | Phe | Ala | Lys | Ser | Lys | Trp |
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| Arg | Gln | Ala | Phe | Asn | Ala | Ala | Ala | Val | Val | His | His | Met | Arg | Lys | Leu |
| 305 | | | | | | 310 | | | | 315 | | | | | 320 |
| His | Met | Asn | Leu | His | Ser | Pro | Gly | Val | Arg | Pro | Glu | Val | Glu | Asn | Arg |
| | | | | | | 325 | | | | 330 | | | | 335 | |
| Pro | Pro | Glu | Thr | Gln | Ala | Ser | Glu | Thr | Ser | Arg | Pro | Ser | Ser | Pro | Glu |
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Ile Thr Ile Thr Glu Ala Pro Val Leu Asp His Ser Val Ala Leu Pro
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 385 390 395 400
 Ser Ser Leu Val Pro Met His Gln Gly Ser Leu Ala Ala Gly Pro Cys
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 Tyr Cys Ser Glu Pro Thr Leu Leu Lys Lys Ala Asn Lys Lys Gln Asn
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